

## CLAIMS

1. A radio controlled watch comprising:

an antenna for receiving a radio wave including time information;

5 a watch device for causing a display portion to display time information such as a present time by the radio wave received by the antenna;

a watch case for accommodating the antenna and the watch device; and

10 at least one non-magnetic member fixed to an internal surface of the watch case and having an electric resistivity set to be  $7.0 \mu \Omega$ -Cm or less.

2. The radio controlled watch according to claim 1, wherein  
15 the watch case is formed by at least one material selected from titanium, a titanium alloy, stainless steel, tungsten carbide and tantalum carbide, and

the non-magnetic member is fixed to an internal surface of the watch case.

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3. The radio controlled watch according to claim 1, wherein the watch case includes a watch case body,

the watch case body being formed by at least one material selected from titanium, a titanium alloy, stainless steel,

tungsten carbide and tantalum carbide, and

the non-magnetic member is fixed to an internal surface of the watch case body.

5 4. The radio controlled watch according to any of claims 1 to 3, wherein the watch case includes a watch case body and a back cover attached and fixed to the watch case body,

the back cover being formed by at least one material selected from titanium, a titanium alloy, stainless steel,

10 tungsten carbide and tantalum carbide, and

the non-magnetic member is fixed to an internal surface of the back cover.

5. The radio controlled watch according to any of claims 15 1 to 4, wherein the non-magnetic member is formed by at least one material selected from gold, silver, copper, brass, aluminum, magnesium, zinc and their alloy.

6. The radio controlled watch according to any of claims 20 1 to 4, wherein the non-magnetic member is formed by bonding at least two materials selected from gold, silver, copper, brass, aluminum, magnesium and their alloy.

7. The radio controlled watch according to any of claims

1 to 6, wherein a resin member is provided in close contact with an internal surface of the non-magnetic member.

8. The radio controlled watch according to any of claims 1 to 7, wherein the antenna is constituted by a magnetic core member and a coil wound around the magnetic core member in plural turns, and

the non-magnetic member is provided in a position in which the antenna is projected onto the internal surface of the watch case in parallel along at least one plane including an axis of the magnetic core member.

9. The radio controlled watch according to claim 8, wherein the antenna is constituted by the magnetic core member and the coil wound around the magnetic core member in plural turns, and

the non-magnetic member is provided in a position of the watch case body in which the antenna is projected onto the internal surface of the watch case in parallel along at least one plane including the axis of the magnetic core member.

10. The radio controlled watch according to claim 8, wherein the antenna is constituted by the magnetic core member and the coil wound around the magnetic core member in plural turns,

and

the non-magnetic member is provided in a position of the back cover in which the antenna is projected onto the internal surface of the watch case in parallel along at least one plane  
5 including the axis of the magnetic core member.

11. The radio controlled watch according to any of claims 1 to 7, wherein the antenna is constituted by a magnetic core member and a coil wound around the magnetic core member in plural  
10 turns, and

the non-magnetic member is provided in a position of the internal surface of the watch case which is opposed to at least one end in an axial direction of the antenna.

15 12. The radio controlled watch according to any of claims 1 to 11, wherein the watch case is constituted by a clad material obtained by bonding the non-magnetic member in pressure contact with at least one material selected from titanium, a titanium alloy and stainless steel.

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13. The radio controlled watch according to any of claims 1 to 11, wherein the watch case includes a watch case body,  
the watch case body being constituted by a clad material obtained by bonding the non-magnetic member in pressure contact

with at least one material selected from titanium, a titanium alloy and stainless steel.

14. The radio controlled watch according to any of claims  
5 1 to 13, wherein the watch case includes a watch case body and a back cover attached and fixed to the watch case body,

the back cover being constituted by a clad material obtained by bonding the non-magnetic member in pressure contact with at least one material selected from titanium, a titanium  
10 alloy and stainless steel.

15. The radio controlled watch according to any of claims 1 to 11, wherein the non-magnetic member is fixed to the watch case by at least one means such as press fitting, caulking,  
15 welding, soldering and an adhesive.

16. The radio controlled watch according to any of claims 1 to 11, wherein the watch case includes a watch case body, and

20 the non-magnetic member is fixed to the watch case body by at least one means such as press fitting, caulking, welding, soldering and an adhesive.

17. The radio controlled watch according to any of claims

1 to 11 and 16, wherein the watch case includes a watch case body and a back cover attached and fixed to the watch case body, and

the non-magnetic member is fixed to the back cover by  
5 at least one means such as press fitting, caulking, welding, soldering and an adhesive.

18. The radio controlled watch according to any of claims 1 to 11, wherein the non-magnetic member fixed to the watch  
10 case is formed by means such as a wet plating method or a metal spraying method.

19. The radio controlled watch according to any of claims 1 to 11, wherein the watch case includes a watch case body,  
15 and

the non-magnetic member fixed to the watch case body is formed by means such as a wet plating method or a metal spraying method.

20 20. The radio controlled watch according to any of claims 1 to 11 and 18, wherein the watch case includes a watch case body and a back cover attached and fixed to the watch case body, and

the non-magnetic member fixed to the back cover is formed

by means such as a wet plating method or a metal spraying method.

21. The radio controlled watch according to any of claims  
1 to 20, wherein the non-magnetic member has a thickness of  
5 50  $\mu\text{m}$  to 2000  $\mu\text{m}$ .

22. A radio controlled watch comprising:

an antenna for receiving a radio wave including time  
information;

10 a watch device for causing a display portion to display  
time information such as a present time by the radio wave received  
by the antenna; and

a watch case for accommodating the antenna and the watch  
device,

15 wherein the watch case has at least a part constituted  
by a non-magnetic member having an electric resistivity of  
7.0  $\mu\Omega\text{-cm}$  or less, and

a surface of the watch case is subjected to surface  
finishing.

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23. The radio controlled watch according to claim 22, wherein  
the watch case includes a watch case body, a back cover and  
a bezel,

at least one of the watch case body, the back cover and

the bezel is constituted by a non-magnetic member, and

the watch case other than the watch case constituted by the non-magnetic member is constituted by at least one material selected from titanium, a titanium alloy, stainless steel, tungsten carbide, tantalum carbide and a resin.

24. The radio controlled watch according to claim 22 or 23, wherein the non-magnetic member is constituted by at least one material selected from gold, silver, copper, brass, aluminum, magnesium, zinc and their alloy.

25. The radio controlled watch according to claim 22 or 23, wherein the non-magnetic member is formed by bonding at least two materials selected from gold, silver, copper, brass, aluminum, magnesium and their alloy.

26. The radio controlled watch according to any of claims 22 to 24, wherein the antenna is constituted by a magnetic core member and a coil wound around the magnetic core member in plural turns, and

a member of the watch case onto which the antenna is projected in parallel along at least one plane including an axis of the magnetic core member or a portion onto which the projected member of the watch case is projected is constituted



by the non-magnetic member.

27. The radio controlled watch according to any of claims 22 to 24, wherein the antenna is constituted by a magnetic core member and a coil wound around the magnetic core member in plural turns, and

a member of the watch case opposed to at least one end in an axial direction of the antenna or a portion opposed to the member of the watch case opposed to the end in the axial direction is constituted by the non-magnetic member.

28. The radio controlled watch according to any of claims 22 to 27, wherein the surface finishing is constituted by at least one surface finishing process selected from a mirror finished surface, a mat finished surface, a hairline pattering, a pattern and a letter.

29. The radio controlled watch according to any of claims 22 to 28, wherein the surface finishing is constituted by a metal coated film,

the metal coated film being provided by at least one means selected from a wet plating method, a vapor deposition method, an ion plating method, an arcing method and a sputtering method.

30. The radio controlled watch according to any of claims 22 to 29, wherein a surface of the non-magnetic member is subjected to the surface finishing.

5 31. A radio controlled watch comprising:

an antenna for receiving a radio wave including time information;

a watch device for causing a display portion to display time information such as a present time by the radio wave received  
10 by the antenna; and

a watch case for accommodating the antenna and the watch device,

wherein the watch case is constituted by a metal.

15 32. The radio controlled watch according to claim 31, wherein the antenna is provided in contact with an internal surface of the watch case.

33. The radio controlled watch according to claim 31, wherein  
20 the antenna is provided apart from an internal surface of the watch case.

34. The radio controlled watch according to any of claims 31 to 33, wherein the watch case and the antenna are set in

such a manner that a body thickness T1 of a watch case body of the watch case ranges from  $300\mu\text{m}$  to  $5000\mu\text{m}$ .

35. The radio controlled watch according to claim 34, wherein  
5 the watch case and the antenna are set in such a manner that the body thickness T1 of the watch case body of the watch case ranges from  $500\mu\text{m}$  to  $2000\mu\text{m}$ .

36. The radio controlled watch according to any of claims  
10 31 to 35, wherein the watch case and the antenna are set in such a manner that a gap D1 from an internal surface of the watch case body of the watch case to the antenna ranges from 0 to  $40000\mu\text{m}$ .

15 37. The radio controlled watch according to claim 36, wherein the watch case and the antenna are set in such a manner that the gap D1 from the internal surface of the watch case body of the watch case to the antenna ranges from  $500\mu\text{m}$  to  $10000\mu\text{m}$ .

20 38. The radio controlled watch according to any of claims 31 to 37, wherein the watch case and the antenna are set in such a manner that a back cover thickness T2 of a back cover of the watch case ranges from  $100\mu\text{m}$  to  $5000\mu\text{m}$ .

39. The radio controlled watch according to claim 38, wherein the watch case and the antenna are set in such a manner that the back cover thickness T2 of the back cover of the watch case ranges from  $300\mu\text{m}$  to  $2000\mu\text{m}$ .

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40. The radio controlled watch according to any of claims 31 to 39, wherein the watch case and the antenna are set in such a manner that a gap D2 from an internal surface of the back cover of the watch case to the antenna ranges from 0 to  
10  $5000\mu\text{m}$ .

41. The radio controlled watch according to claim 40, wherein the watch case and the antenna are set in such a manner that the gap D2 from the internal surface of the back cover of the  
15 watch case to the antenna ranges from  $100\mu\text{m}$  to  $700\mu\text{m}$ .

42. The radio controlled watch according to any of claims 31 to 41, wherein the watch case body of the watch case is formed by at least one material selected from titanium, a titanium  
20 alloy, stainless steel, tungsten carbide and tantalum carbide.

43. The radio controlled watch according to any of claims 31 to 41, wherein the watch case body of the watch case is formed by at least one material selected from gold, silver, copper,

brass, aluminum, magnesium, zinc and their alloy.

44. The radio controlled watch according to any of claims  
31 to 41, wherein the watch case body of the watch case is formed  
5 by bonding at least two materials selected from gold, silver,  
copper, brass, aluminum, magnesium, zinc and their alloy.

45. The radio controlled watch according to any of claims  
31 to 41, wherein the watch case body of the watch case is formed  
10 of a hard metal.

46. The radio controlled watch according to any of claims  
31 to 45, wherein the back cover of the watch case is formed  
by at least one material selected from titanium, a titanium  
15 alloy, stainless steel, tungsten carbide and tantalum carbide.

47. The radio controlled watch according to any of claims  
31 to 45, wherein the back cover of the watch case is formed  
by at least one material selected from gold, silver, copper,  
20 brass, aluminum, magnesium, zinc and their alloy.

48. The radio controlled watch according to any of claims  
31 to 45, wherein the back cover of the watch case is formed  
by bonding at least two materials selected from gold, silver,

copper, brass, aluminum, magnesium and their alloy.

49. The radio controlled watch according to any of claims  
31 to 45, wherein the back cover of the watch case is formed  
5 of a hard metal.

50. The radio controlled watch according to any of claims  
31 to 49, wherein at least one of the watch case body and the  
back cover of the watch case is subjected to a surface treatment  
10 and/or a hardening treatment.

51. The radio controlled watch according to any of claims  
31 to 50, wherein an internal surface of the watch case body  
of the watch case and an external side surface of the antenna  
15 are provided in substantially parallel with each other as seen  
on a plane.

52. The radio controlled watch according to any of claims  
31 to 50, wherein an internal surface of the back cover of the  
20 watch case and an external side surface of the antenna are  
provided in substantially parallel with each other.

53. The radio controlled watch according to any of claims  
31 to 50, wherein one end face of both ends in an axial direction

of the antenna is provided in substantially parallel with an internal surface of the back cover of the watch case.

54. The radio controlled watch according to any of claims  
5 31 to 50, wherein one end face of both ends in an axial direction of the antenna is provided substantially perpendicularly to an internal surface of the back cover of the watch case.

55. The radio controlled watch according to any of claims  
10 31 to 50, wherein an external side surface of the antenna is provided substantially perpendicularly to an internal surface of the back cover of the watch case.

56. The radio controlled watch according to any of claims  
15 31 to 55, wherein the back cover of the watch case takes a two-dimensional planar shape.

57. The radio controlled watch according to any of claims  
31 to 56, wherein at least one non-magnetic member having an  
20 electric resistivity of  $7.0 \mu \Omega\text{-Cm}$  or less is fixed to the internal surface of the watch case.

58. The radio controlled watch according to claim 57, wherein the non-magnetic member is constituted by at least one material

selected from gold, silver, copper, brass, aluminum, magnesium, zinc and their alloy.

59. The radio controlled watch according to claim 57, wherein  
5 the non-magnetic member is formed by bonding at least two materials selected from gold, silver, copper, brass, aluminum, magnesium and their alloy.

60. The radio controlled watch according to any of claims  
10 57 to 59, wherein the antenna is constituted by a magnetic core member and a coil wound around the magnetic core member in plural turns, and

a member of the watch case onto which the antenna is projected in parallel along at least one plane including an  
15 axis of the magnetic core member or a portion onto which the projected member of the watch case is projected is constituted by the non-magnetic member.

61. The radio controlled watch according to any of claims  
20 57 to 59, wherein the antenna is constituted by a magnetic core member and a coil wound around the magnetic core member in plural turns, and

a member of the watch case opposed to at least one end in an axial direction of the antenna or a portion opposed to



the member of the watch case opposed to the end in the axial direction is constituted by the non-magnetic member.

62. A radio controlled watch comprising:

5 an antenna for receiving a radio wave including time information;

a watch device for causing a display portion to display time information such as a present time by the radio wave received by the antenna;

10 an antimagnetic plate for preventing an influence of an external magnetism; and

a watch case for accommodating the antenna, the watch device and the antimagnetic plate,

15 wherein the antimagnetic plate provided in the watch case has an opening portion in an opposed part to the antenna.

63. The radio controlled watch according to claim 62, wherein the antenna is constituted by a magnetic core member and a coil wound around the magnetic core member in plural turns, and

20 an opening portion is provided on the antimagnetic plate in a position in which the antenna is projected in parallel along at least one plane including an axis of the magnetic core member.

64. The radio controlled watch according to claim 62, wherein the antenna is constituted by a magnetic core member and a coil wound around the magnetic core member in plural turns, and an opening portion is provided on the antimagnetic plate in an opposed position to at least one end in an axial direction of the antenna.

65. The radio controlled watch according to any of claims 62 to 64, wherein the antenna is provided to be positioned on an outside of the antimagnetic plate.

66. The radio controlled watch according to any of claims 62 to 65, wherein the antenna has at least a part protruded from the opening portion of the antimagnetic plate and positioned on an internal surface side of a case body of the watch case.

67. The radio controlled watch according to any of claims 62 to 65, wherein the antenna has at least a part protruded from the opening portion of the antimagnetic plate and positioned on a back cover side of the watch case.

68. The radio controlled watch according to any of claims 62 to 65, wherein the antenna has at least a part protruded from the opening portion of the antimagnetic plate and positioned

on a display plate side.

69. The radio controlled watch according to any of claims 62 to 68, wherein the antimagnetic plate is formed by at least  
5 one material selected from pure iron and Permalloy.

70. The radio controlled watch according to any of claims 62 to 69, wherein a non-magnetic member having an electric resistivity of  $7.0 \mu \Omega\text{-Cm}$  or less is provided on an internal  
10 surface of the antimagnetic plate.

71. The radio controlled watch according to any of claims 62 to 64, 69 and 70, wherein the non-magnetic member is provided in the opening portion of the antimagnetic plate.

15 72. The radio controlled watch according to claim 70 or 71, wherein the non-magnetic member is constituted by at least one material selected from gold, silver, copper, brass, aluminum, magnesium, zinc and their alloy.

20 73. The radio controlled watch according to claim 70 or 71, wherein the non-magnetic member is formed by bonding at least two materials selected from gold, silver, copper, brass, aluminum, magnesium, zinc and their alloy.

74. The radio controlled watch according to any of claims 62 to 73, wherein the non-magnetic member has a rising portion erected in a direction of the display plate, and

5 the rising portion abuts on a part of the watch case, thereby regulating a rotation of the antimagnetic plate.

75. A radio controlled watch comprising:

an antenna for receiving a radio wave including time information;

10 a watch device for causing a display portion to display time information such as a present time by the radio wave received by the antenna; and

a watch case for accommodating the antenna and the watch device,

15 wherein the watch case is constituted by an electrically non-conductive material or a material having a low electric resistivity, and

an exterior member formed by an electrically conductive material which is attached to an outside of the watch case is  
20 provided.

76. The radio controlled watch according to claim 75, wherein the exterior member covers an upper surface of a watch case body of the watch case.

77. The radio controlled watch according to claim 75 or 76, wherein the exterior member covers an external side surface of the watch case body of the watch case.

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78. The radio controlled watch according to any of claims 75 to 77, wherein the electrically non-conductive material constituting the watch case is formed by at least one electrically non-conductive material selected from a synthetic resin, rubber and ceramic.

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79. The radio controlled watch according to any of claims 75 to 77, wherein a material having a low electric resistivity which constitutes the watch case includes at least one material having a low electric resistivity which is selected from gold, silver, copper, brass, aluminum, magnesium and their alloy.

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80. The radio controlled watch according to any of claims 75 to 79, wherein an electrically conductive material constituting the exterior member includes at least one electrically conductive material selected from stainless, titanium and a titanium alloy.

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